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No. 1

NATURE-PRINTED BUTTERFLIES.

BY JAMES FLETCHER, OTTAWA, ONT.

The season of warm days, flowers and butterflies is over now, and the look-out is cold, bleak and bare. Apparently there is little for the scientific lover of nature to do in the way of collections at this time of year; such, however, is far from being actually the case, as all who have collected will testify. It is, in fact, one of the busiest seasons for collectors; all the treasures gathered during the summer months have to be *gone through*. In the first place, those known have to be taken out and sorted away into their proper places in the cabinet; the remainder then have to be re-sorted and divided up into sets according to the families to which they appear to belong, and after this they have to be examined critically, and, if possible, identified. It frequently happens that a collector of butterflies has an opportunity of capturing a large number of some local species in one day, and finds it impossible or irksome to set them all before they become too dry, as they will in a very short time in hot weather. When they are once dry, too, one is apt to think that as they can get no worse, they may safely be put aside until some more convenient occasion, to be relaxed and set up; but this convenient occasion, like a good many others, is sometimes very long coming and many valuable specimens are consequently thus lost.

An accident which occurred to the glass of one of the drawers of my butterfly cabinet lately, was the means of reminding me of a process shown me some years ago by a Captain Lloyd, of the English Navy. The accident referred to was the breaking of the cover of one of my cases which contained some rare butterflies, in consequence of which it was impossible to close the door of the cabinet tightly. My horror can be better imagined than expressed when, upon opening the door and pulling out this drawer, about a fortnight afterwards, I found that there was not a single perfect specimen in it; a mouse had got in, and what was once a

neatly arranged case of butterflies was now nothing but a chaos of nibbled bodies, loose wings, pins and labels. I had not the heart at first to throw out these fragments, and so wipe out entirely the pleasing recollections each brought up in my mind of rambles through the woods and in the country, so carefully gathering up the wings I put them away in a little box. The idea then struck me of printing them as I had seen my old friend do them, and as I think it would be a very convenient way for Entomologists and Agriculturists to send butterflies for identification, when spare duplicates are to be had, I am induced to send a description of the *modus operandi* :

Take the insect in your left hand, holding it beneath the thorax ; then with a pair of sharply-pointed scissors cut off the wings as close to the body as possible. Occasionally, unless the scissors are very sharp, some of the muscles are torn away from the thorax with the wings ; these must be carefully removed. Arrange the wings in pairs and put them with the body on one side, in some convenient place where they may be easily got at when you are ready for them. Now take a piece of white paper of the size required, and fold it in two like a sheet of note-paper ; then with a camel-hair brush lay on a thin wash of perfectly clear gum-arabic, fold down the upper half and pass the hand lightly over it so as to spread the gum evenly between the two sides ; now re-open it, and taking up the wings with the tip of the brush, the lower ones first, arrange them carefully in the position wanted, leaving space enough intervening between the two pairs to paint in the body afterwards. Spare no pains in arranging the wings ; this corresponds with "setting" for a cabinet. I have seen many good collections of insects, made by amateurs, rendered almost useless by the want of a little thought on this point. The proper position for a butterfly to be set in is that which it takes when sunning itself. Copy nature and you cannot go wrong. When the wings are quite even, gently fold down the upper half of the paper and put your specimen under a heavy weight, or in a press, until quite dry. I generally leave mine for some hours at least. When it is quite dry take it out and place it against a window pane so that the butterfly may be clearly defined against the light. Now very carefully draw a line with a black lead pencil round the edges of the wings ; then lay it down on an even surface and paint with clean water all over the part outside and up to the outline. After a few minutes the water will saturate the paper and dissolve the gum ; the two sides will then separate easily, and this being done, it will be found that

on one side is a perfect representation of the upper side of the butterfly, on the opposite another of the under side, and loose between these a perfectly clear horny membrane; the explanation of this is, the upper ends of the scales are adhering to the gum and what we now look at are the lower ends or roots. When painting with water, to dissolve the gum, great care must be taken not to let it run over the outline on to the wings, or else the scales will not adhere to the paper, but will remain on the membrane.

The work is not yet finished, however; a most important part has still to be done. This is the filling in of the body and antennæ; the easiest way to do this is with a fine pen and some water-colors. Place the body from which the wings were severed before you and copy it, taking particular notice of any characteristic markings, as, for instance, the color of the eyes, legs, or antennæ. When finished cut it out with a pair of sharp scissors, paste it in an album, and write a short description of its capture, giving the date, locality and any other interesting circumstances connected with it. I have found it is easier to put in the antennæ after the prints are gummed into the collection, as on account of their fragility they are difficult to cut out neatly. Should the collector happen to be an artist, a most beautiful collection may be made in this manner by painting pretty designs with flowers for each species and gumming the butterflies in in natural positions; of course, too, its scientific value will be materially increased if those plants are introduced to which the insect is most partial, and, when possible, a sketch of the larva and pupa is added.

The chief advantages of this process are: the ease with which it is done; the great convenience with which the specimens are preserved or transmitted through the post for identification or exchange; their greater durability, for they will stand much rougher handling than specimens preserved in the ordinary way; and, more important than all these, the fact that if you have only one specimen you can show both the upper and under sides at once, and also the membranous skeleton of the wings, which can thus be very easily examined and makes a beautiful object for the microscope; moreover, if you have only an imperfect specimen, it is possible to preserve a good likeness of it by filling in the wanting parts with water-colors. Further, it does not matter how old your specimens are; I have some prints which I have taken from butterflies collected in India more than twenty years ago, which are quite as good as others printed on the same day that the insects were caught here.

ENTOMOLOGY FOR BEGINNERS—No. 2.

BY THE EDITOR.

CATOCALA ULTRONIA.

In the genus *Catocala* is included a number of very beautiful moths, many of them of large size, and restricted in their distribution to the northern portions of America. Most of them have the hind wings red, banded with black, and hence have received the common appellation of "Red under-wings." Some few species, however, have the red ground replaced by white, or by plain black, or dark brown edged with white, but



Fig. 1.

these latter are greatly in the minority and much less frequently met with than those with red hind wings. The fore wings are usually of varying shades of rich gray or brown.

In *Catocala ultrovia* (fig. 1) the fore wings are of a rich umber color, darkest along the hind margin, with a broad diffused ash-colored band along the middle, not extending to the apex, which is brown; there are also several zigzag lines of brown and white crossing these wings. The hind wings are deep red with a wide black band along the outer margin and a narrower band of the same color across the middle. The ciliæ which border the wings are partly white and partly brown.

The larva feeds on the leaves of wild plum and is also found attacking the cultivated varieties. When full grown, which is about the 20th of June, it is nearly two inches long, a leech-like creature with its body thickest in the middle and tapering towards each end. When at rest it adheres so closely to the bark of the branch and so nearly resembles it in color, that it is difficult to detect. The body is of a dull grayish-brown studded with brownish dots and rows of dull reddish tubercles. On the top of the ninth segment or ring there is a stout fleshy horn, nearly upright, about one-twelfth of an inch long, pointed and similar in color to the

body, but with an irregular grayish patch at each side. On the twelfth segment there is a low fleshy ridge margined behind with deep reddish brown and an oblique stripe of the same color extends forward nearly to the spiracle on this segment. The terminal segment is flattened and has a number of small pale reddish and blackish tubercles scattered over its surface. Along the sides of the body close to the under surface there is a thick fringe of short fleshy-looking hairs of a delicate pink color.

The under surface is also of a delicate pink, of a deeper shade along the middle, becoming bluish towards the margins with a central row of nearly round black spots which are largest from the seventh to the eleventh segments inclusive. The anterior segments are greenish-white tinted with rosy pink along the middle, with a dull reddish spot at the base behind each pair of feet.

When about to change to a chrysalis the larva makes a rough enclosure by drawing together fragments of leaves and fastening them with silken threads, within which it undergoes its transformation and appears as a moth in about three weeks afterwards.

The moth is on the wing during the greater part of July and August, is attracted by light and comes freely to sugar. All the insects of this family are night-flyers and expose their brilliant hind wings only in flight. When at rest the gray or dull brown upper wings overlap and cover up the gaily tinted under wings like a very flat roof.

THE AMERICAN CURRANT BORER (*Psenocerus supernotatus*).

The accompanying cut (fig. 2) represents an enlarged view of a native currant borer, *Psenocerus supernotatus*; the small outline figure shows the natural size. It is a beetle belonging to the family of longicorns, *Cerambycidae*, which doubtless had its home originally among the wild currant bushes of our woods, but a more extended and inviting field having been opened for



Fig. 2.



Fig. 3.

it by the planting of the cultivated varieties in our gardens, it has taken kindly to them, and although not so destructive as the imported currant borer, *Egeria tipuliformis* (fig. 3), has in many instances proved quite troublesome. In nearly all our gardens numbers of the currant stalks annually perish, and were it not for the vigorous growth of new shoots from year to year, the bushes would soon be destroyed. If one

of these stalks is split asunder the cause of its death is manifest, for through its whole length it is found to be more or less eaten away, the hollows being filled in places by a fine sawdust-like powder. This is sometimes the work of the imported currant borer (fig. 3), and sometimes that of the native species (fig. 2).

Early in June the parent beetle of the native currant borer deposits her eggs upon the currant stalks, where they soon hatch into tiny grubs which burrow into the heart of the stem, and feeding on its pith, reach full growth before the close of the season. They are footless grubs, which measure when full grown about half an inch in length. The head is scarcely half as broad as the body, is of a dark brown color, with black jaws. The body is whitish with some brown dots along each side, and is slightly clothed with very fine short hairs. When full grown and about to change to a chrysalis, the larva gnaws a channel through the woody fibre to the outer bark, so that when changed to a beetle it can make its escape by merely rupturing the bark. The cavity thus made is filled with little chips to prevent the bark from being prematurely broken, and below this stuffing the insect constructs a bed of short woody fibres, packing the passage below with a finer material resembling sawdust. Within this enclosure, which is about half an inch in length, the larva changes to a chrysalis and reposes until the fully formed beetle is ready to emerge; then gradually drawing away the obstacles to its egress, it finds its way to the end of the passage, and gnawing a small round hole through the bark, effects its escape.

The beetle is black with the edges of the wing covers and the thorax pale chestnut brown. On each wing cover there is a rather large white spot beyond the middle, and two smaller anterior spots, which are sometimes ash-gray and sometimes yellowish. The antennæ, which are shorter than the body, are pale brown thickly clothed with short ash-gray hairs. The under side is black and sparsely covered with short gray hairs.

Dr. Fitch describes two parasites which he found attacking this pest in the larval state, one a small ichneumon fly, the other that of a small two-winged fly. Hence, secluded as it seems to be within the centre of the currant stem, it is unable to escape the acute instincts of its enemies, who searching it out, feed on its body and cause its death.

As these worms remain in the dead stalks throughout the winter, their destruction is easily compassed by breaking off all the dead wood to the surface of the ground and burning it.

LIST OF DIURNAL LEPIDOPTERA TAKEN IN THE VICINITY OF PORTLAND, MAINE.

BY H. H. LYMAN, MONTREAL, P. Q.

From 1868 till 1876 I spent from six to eight weeks of the summer on Cape Elizabeth, near Portland, Me., the visits extending from July 14th or 16th to Sept. 5th or 8th, and the following list of Diurnal Lepidoptera is compiled from my diaries :

1. *Papilio asterias* F. Formerly somewhat common, latterly very scarce ; July and August.
2. *Papilio turnus* L. One specimen of the larva was found nearly full grown on Aug. 3, 1873.
3. *Pieris oleracea* Bd. Very scarce ; July and August.
4. *Pieris rapæ* L. Generally very common all summer ; quite scarce in 1874.
Var. nov. *angliæ* Scud. Scarce ; none taken till 1875.
5. *Colias philodice* Godt. Very common all summer ; white females not common.
6. *Danaïs archippus* F. Generally common, latterly rather scarce ; August to September.
7. *Argynnis idalia* Cram. Some years scarce, sometimes somewhat plentiful ; middle of July to beginning of September.
8. *Argynnis cybele* F. Somewhat common ; July and August.
9. " *aphrodite* F. Common ; July and August.
10. " *atlantis* Edw. Rather common ; July to middle of Aug.
11. " *myrina* Cram. Very common ; one brood in July and another towards the end of August and first of September.
12. *Argynnis bellona* F. Common ; occurs at the same times as the last species.
13. *Phyciodes Harrisii* Scud. Not uncommon ; July.
14. " *nycteis* Doub. Rare ; July.
15. " *tharos* Drury. Very common ; July.
16. *Grapta interrogationis* F. Rare ; August to September ; the three specimens which I saw belonged to the var. *umbrosa* Lint.
17. *Grapta comma*, var. *Harrisii* R. Rare ; one specimen taken 9th September, 1876.
18. *Grapta faunus* Edw. Rare ; latter half of August.

19. *Grapta progne* Cram. Common ; July and first half of August and sometimes early in September.
20. *Vanessa antiopa* L. Common ; July and August.
21. " *Milberti* Godt. Very scarce, though formerly more common ; August.
22. *Vanessa J-album* Bd. Not common ; from towards end of August into September.
23. *Pyrameis atalanta* L. Generally scarce, being preyed upon by four or five distinct species of parasites ; August.
24. *Pyrameis huntera* Drury. Not common ; August and September.
25. " *cardui* L. Formerly common, latterly very scarce ; August and September.
26. *Junonia lavinia* Cram. Very rare ; one specimen, the only one seen, taken August 11, 1876.
27. *Limenitis proserpina* Edw. Occasional, July ; sometimes there is a second brood towards the end of August and beginning of September, as in 1874.
28. *Limenitis arthemis* Drury. Not abundant ; July and beginning of August.
29. *Limenitis disippus* Godt. Common ; end of July to September.
30. *Neonympha eurytris* F. Two worn specimens taken July 17, '73.
31. " *canthus* L. Somewhat abundant ; July.
32. *Satyrus alope* F. Common ; August.
33. " *nephele*? Kirby. Not so common as last ; August. I have taken almost every variety between these two forms.
34. *Thecla humuli* Harris. Very rare ; July.
35. " *mopsus* Hübn. Not common ; July and August.
36. *Chrysophanus epixanthe* Bd.-Lec. Generally very rare, obtainable some seasons, as in 1869 and 1875 ; latter part of July and first half of August.
37. *Chrysophanus Americana* D'Urban. Very common ; August.
38. *Lycæna neglecta* Edwards. Rare ; July and August.
39. " *comyntas* Godt. Very rare ; July.
40. *Pamphila zabulon* Bd.-Lec. This species may be common earlier in the season than July 15th ; I took a rubbed *Pocahontas* var ♀ Scud. on July 17, 1873.
41. *Pamphila leonardus* Harr. Common ; end of August and during September.

42. *Pamphila peckius* Kirby. Common ; from middle of July to end of August.
43. *Pamphila cernes* Bd.-Lec. (ahaton Harr.) Common ; July.
44. " *manataaqua* Scud. (cernes Harr.) Rare ; one specimen taken July 20th, 1874.
45. *Pamphila metacomet* Harr. Common ; from middle of July to end of August.
46. *Eudamus pylades* Scud. Somewhat common ; July.

These are all the species which I have taken during my visits to this locality, but others doubtless occur there, especially in the spring and early summer, and there are undoubtedly early broods of some of the above species. I have, with very few exceptions, followed the classification and nomenclature of Mr. Edwards' recent Catalogue. I have given both the names *alope* and *nephele*, though I have doubted their distinctness.

DESCRIPTION OF THE PREPARATORY STAGES OF GRAPTA PROGNE, CRAMER.

BY W. H. EDWARDS, COALBURGH, W. VA.

EGG.—Conical, the base rounded ; marked by 8 or 9 vertical ribs, which near the base are depressed, but on upper third are considerably elevated, increase gradually in prominence and terminate abruptly around a small depression at summit ; these ribs are compressed and their sides are cut by grooves perpendicular to the surface of the egg ; the spaces between them crossed by many fine striæ ; color green. Duration of this stage 5 days.

YOUNG LARVA —Length .08 inch ; cylindrical, nearly even, the segments well rounded ; on 2 a black dorsal band on which are several small tubercles, with long hairs ; on the middle of each segment after 2 a transverse row of small black tubercles, three on either side of body, each with long black hair, those on the anterior segments bent forward, on the posterior ones bent back ; color at first dull green, the last segments with a brown tint ; but as the stage progresses the color becomes dull

white and brown, 5, 7 and 9 being brown, the rest white; feet and pro-legs green; head ovoid, black-brown, shining, with some short black hairs. Duration of this stage 4 days.

After 1st Moul't.—Length .16 inch; color greenish-brown; there now appear seven rows of large branching spines, one dorsal and three lateral, besides an additional row of minute similar ones over the legs and feet, as with all *Grapta* larvæ, and these spines are found at every stage to maturity; the dorsal row begins on segment 5 and ends on 12; the first lateral row begins on 3 and ends on 12; the second lateral row begins on 3, but is omitted on 4, and ends on 13; there is, however, on 4 a spine between second and third laterals; the third lateral row begins on 5 and ends on 12; these spines are all long, irregularly tapering, shining black, and the tips of both spines and branches end in a black hair or bristle; all rise from light yellow tubercles and are yellow about half way up; on 12 and 13 they are almost wholly yellow; on the posterior end of 12 is a row of four small spines, and on 13 two small ones between the large laterals, and others, also small, behind; on 2 is a collar of small spines arranged two on either side the dorsal line, and behind and between these one other; also two lower down the side; head obovoid, bilobed, brown-black, shining, with black hairs; on each vertex a compound black spined process. To next moult 3 days.

After 2nd Moul't.—Length .24 inch; same shape and spines generally the same, but longer, as are also their branches; many of the latter end in white hairs; the first laterals on the even segments 4, 6, etc., to 12, have the lower half the spines and the tubercles yellow, the odd segments have them dull yellow; for twelve hours after the moult the color of body was largely yellow, but changed then to brown, with whitish cross lines; head as before, the spines on vertices longer; on the face many simple conical spines, white or yellowish, with concolored hairs. Duration of this stage 3 days.

After 3rd Moul't.—Length .5 inch; color glossy black from 3 to 11, crossed on the posterior half of most of the segments by three white, sometimes gray-white, lines; the broad ridges on which the spines stand are marked from 5 to 11 by white or sometimes gray bars or stripes obliquely forward, from the dorsals forming a V to each spine; from first and second laterals one bar to each spine parallel to the arm of the V on either side; the spines are long and slender, those of dorsal row longest; the dorsals and first laterals on 4, 5 and 6 are honey-yellow, the former to

the tips, the others are black at tip ; on 7, 9, 11 the spines of these rows are dull yellow, black tipped ; on 8, 10, 12, 13 are all dull yellow ; the second and third laterals are black on dull yellow tubercles ; on 2 a collar of small yellow spines from similar tubercles ; feet black, pro-legs greenish-yellow ; head subcordate, flattened frontally, each vertex rather high and bearing a stout black compound spine or spinous process ; the face and sides covered with small, simple, conical spines of irregular lengths, black, light yellow and reddish-yellow, each with a hair ; the sides of head and a triangle in front black, rest honey-yellow. As the body lengthened in this stage the black and white bands became more nearly equal in width, and the tubercles and lower parts of spines became of a more uniform honey-yellow. To next moult 3 days.

After 4th and last Moul. —Length .8 inch, at maturity 1 to 1.2 inch ; color buff, the cross stripes on posterior parts of segments black and pale buff ; in front of each dorsal spine is a V-shaped reddish bar, which passes round the spine (or the spine is within the angle), and there is an oblique bar of same color in front of each of the first laterals, and from its base, directed forward and downward ; the second laterals stand on a straight or slightly arched bar of same color ; the spines on 3, 4 and 5 larger than elsewhere ; the dorsals white, yellow at bottom (all yellow spoken of is reddish or honey-yellow), and from yellow tubercles ; the first laterals white from 5 to 11, but on 3, 4 and 12 are black, with buff branches ; the second laterals are all black, yellow at base and stand on yellow tubercles ; the lower laterals all white, on yellow tubercles ; the collar of spines on 2 is yellow ; spiracles black in yellow ovals ; feet black, pro-legs yellow and brown ; head sub-cordate ; on each vertex a large compound spinous process, the main stem black, the branches partly black, partly yellow ; the face and sides thickly covered with simple conical spines of irregular sizes, buff or yellow, the sides and frontal triangle black, rest yellow. The larva suspended 5 days after 4th moult and in less than 12 hours (20th May) pupated.

CHRYsalis. —Length .7 inch, greatest breadth .24 inch ; slender, cylindrical ; the head case high, compressed transversely ; at each vertex a short stout conical projection, the space between being rounded ; mesonotum prominent, followed by a deep rounded excavation ; the carina rather slight, rounded, somewhat angular on posterior side ; the wing cases a little flaring at base, depressed laterally, the margins rounding abruptly to the body ; on the abdomen several rows of tubercles, mostly

small, but those corresponding to the first lateral larval spines are large on the anterior segments and gilded; colors dull green, brown and pinkish white; the head case and mesonotum green, and on wing cases a broad band of same hue; on the side of abdomen from wing case to tail a darker green stripe; remainder of wing cases pink tinted, and all the anterior parts are more or less mottled with pink-brown; on dorsal side of abdomen a pink stripe and on the sides some oblique pink lines. The butterfly emerged after 8 days.

There is much variation in both larva and chrysalis. The foregoing description is drawn from examples obtained from eggs sent me by Mr. C. H. Roberts, at Factory Point, Vermont, in May, 1878. There were nine eggs, and besides the larvæ from these, Mr. Roberts sent two others half grown. All these larvæ were much alike, and they differed so much from other *Progne* larvæ which I found at Hunter, in Catskills, in July, 1877, that I did not believe they could be of the same species. In fact, I thought I was feeding the larvæ of *Gracilis*, a species allied to *Progne* and *Zephyrus*, and whose preparatory stages must be closely like those species. These Catskill larvæ were found on a currant bush near the house at which I was residing. They were four in number, all past last moult and alike; the general color was buff, marked with black; the anterior half of segments 3, 4, 5 was of a more sordid buff; on 6 began to appear imperfect black bands, which on the middle segments were complete and conspicuous, but on the posterior ones were somewhat indistinct as well as broken (these were the V-shaped and oblique bands before spoken of); also on the anterior edge of each of these segments, fronting the dorsal spine, was a small black patch; on the posterior part of segments 3 to 12 were narrow transverse stripes, 8 in number, the 1st, 3rd, 5th and 7th of which were black, the 2nd and 8th yellow-buff, the 4th and 6th gray-buff; of these the yellow were most conspicuous; on the sides of 6 to 12 was a large fulvous patch on each which crossed the bases of 2nd and 3rd laterals, and between these two rows was a black band on which were the spiracles; in line with third laterals was a narrow buff ridge, buff except where it crossed the fulvous patches; and a black band ran along base of body, covering the upper part of the pro-legs; the dorsal spines were whitish, in part pink at base; the first laterals were black and white, 3, 4, 5 and 7 being black with some white branches, the others white with black tips; the second laterals were all black, and the third were either white or black with white tips; the face was black and red, along the cleft

buff. The larvæ measured 1 2 inch. The chrysalids were .8 inch long; the color generally a dull green mixed with pink and white, no where decided; the wing cases yellow-brown with a faint green tint in parts. To imago 9 days.

In 1879 I received two half grown larvæ of *Progne* from Prof. C. H. Fernald, at Orono, Maine, and in some respects these differed from all the others I had before seen. After third moult, the general color of body was as in the Vermont larvæ, that is, black, banded with whitish lines on posterior parts of the segments; but the dorsals and first laterals were all pale fulvous, all tips being black; the second laterals were reddish on anterior segments, gradually running into black on the posterior ones, but the branches always fulvous, the lower laterals sometimes black on upper part; and every spine on the body rose from a fulvous tubercle.

At the last stage these larvæ were red-buff on segments 3 to 5, and on 12, 13; all dorsals were pale fulvous; the first laterals on 3, 12, 13 black with fulvous branches; all others of this row, and all of third lateral row pale fulvous like dorsals; the second laterals black on 3 and on 11 to 13, the rest pale fulvous; and all tubercles fulvous. One larva died, the other reached chrysalis, and resembled the Vermont chrysalids.

By this it appears that there is wide variation in the last two larval stages both in color, markings and the appearance of the spines; so is there in the chrysalis. I had no opportunity of comparing the earlier stages. The Catskill larvæ had an excess of black at maturity, with large fulvous patches on the sides, contrary to what was seen in any other larvæ. These larvae were of the second brood, whereas all the others observed were of the first, and this may account for the great difference.

Mr. Roberts found the eggs laid on wild gooseberry and Prof. Fernald took the larvae he sent me from same plant. I found that they eat cultivated gooseberry and currant readily. They do not fold down a leaf to protect themselves as do the larvae of species of the *Comma* sub-group, (viz., *Satyrus* and *Comma*; also as does *Interrogationis*) under which these larvae conceal themselves and on the edges of which they feed until the leaf is too far consumed to afford a shelter, when they migrate to another and bend it in the same way. But *Progne* larvae lie exposed on the stems or on the under side of the partly eaten leaf. In the later stages they have a very odd habit of holding themselves when at rest. The anterior segments arched and turned round at a right angle to the rest of the body, the middle segments bent in, and the last three segments often

thrown high in air, as in certain species of heterocerous larvæ. The larva then rests wholly on the abdominal legs. I have seen nothing like this in any other *Grapta* larva.

The species is not found in the district in which I now live, but it is abundant in parts of New York and New England. In the Catskills it is double brooded, the first brood of butterflies appearing in early summer, the last in August, and these hibernate.

NOTES ON THE LARVA OF AGROTIS LUBRICANS.

BY G. H. FRENCH, CARBONDALE, ILL.

Several times during the last of August and the fore part of September, while working in my garden, I found a caterpillar that without the use of the lens was green with a white stripe on each side. A more minute description would be as follows :

Length when full grown, 1.25 inches, the shape of the body very much like that of *A. saucia*. Color grass green, marked with white and black as follows : A broad sub-stigmatal line of creamy white that is edged a little above, towards the head, with black ; and below, in the middle of each segment, by a little clouding of the same. On some there is a very faint subdorsal line of greenish white, edged below with black, but on most only the fine black line is perceptible. Dorsal line very narrow, greenish white. Piliferous spots very small, faintly black, from each of which arises a short hair. Stigmata edged with black.

By a casual examination this is a grass green caterpillar with a white stripe on each side, all the other marks being so faint as to be seen only upon closer inspection. The larva reared ceased feeding Sept. 6, and went below the dirt in its box to transform, producing the imago Oct. 8.

Besides the one reared, I took several specimens of the moth here in July, and from this I judge the species to be at least two brooded, possibly three, but that would depend upon the condition in which it hibernates.

CRAMBIDÆ.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

CHILO CRAMBIDOIDES, n. s.

A large stout species with the aspect of *Crambus*. Fore wings pale ochre with two parallel curved, dusky, interrupted extra mesial lines; a row of terminal black separated dots; fringes concolorous. Hind wings pure white, with white fringes. Head and thorax pale ochre. Beneath very pale; the veins conspicuous. Abdomen whitish; second and third basal segments ochre shaded above. I do not detect ocelli. Expanse 38 mil. Hab. Kansas, Prof. Snow. Prof. Zeller writes me that this form may be finally referred to Guenee's genus "*Borer*" (?) of which I know neither type nor description.

SCHOENOBIVS MACRINELLUS Zell, St. Ent. Zeit., 1866, p. 152, Taf. I, fig. 12.

This species is described from Venezuela. Mr. Schwarz has collected a specimen at Enterprise, Florida, May 12, which must be the same species. It only differs from Zeller's figure and description by the want of the terminal points on the wings and the fact that the fringes on primaries are whitish gray. It is new to our fauna. In this same paper of Prof. Zeller's is a description of the North American *Crambus topiarius*, which I mention further on and which Prof. Zeller regards as the North American representative of the European *hortuellus*.

CRAMBUS INTERRUPTUS Grote, CAN. ENT., ix., 101.

I have sent a series of specimens to Prof. Zeller and he informs me that he can find no constant character to separate this species from the European *myellus*, unknown to me, and not previously registered from this country. There seem to be slight differences in the tone of the secondaries, and at first Prof. Zeller thought that there might be in the position of the vitta, but later examples seem to have corrected this latter supposition, judging from Prof. Zeller's letters. *Myellus* is obtained in Europe with the beating net from trees; *conchellus* Tr. is found flying on the treeless alpine meadows. It will be interesting to know the habits of *interruptus*. I was in error in comparing this species with the European *conchellus*.

CRAMBUS DISSECTUS, n. s.

The markings show a resemblance to *saltuellus*, but the species is nearer in some respects to *interruptus*. Color a deep brown. A white shaded stripe along internal margin. A median white stripe ending at extremity of cell, and toothed on its lower edge near the end. A white patch beyond the cell between the tip of the median stripe and the exterior line. A white shade patch above this on costa. The line is ochre brown, shaped as usual, rather sharply angulated, followed by a faint white shade line. Terminal space with a white patch below apices and a narrow white stripe following the margin from the angulation of the exterior line and enclosing a series of black dots, fragments of the terminal black line, which is even on the infra-apical white patch. The terminal markings resemble *videns*, but the lower white stripe is narrower and even throughout. The white is not so silvery. Disc of thorax and head above white. Tegulae brown. Hind wings smoky fuscous, with pale fringes. *Expanse* 20 mil. One specimen from New York. Distinguished by the white stripe on internal margin of primaries.

CRAMBUS LEACHELLUS Zinck.

This species, which I believe to be Walker's *hastiferellus*, occurs also in Vancouver's Island, from whence I have three specimens, No. 5925, from Mr. Hy. Edwards.

CRAMBUS OCCIDENTALIS, n. s.

Three specimens from Mr. Behrens taken in Sauzalito, Cal., Oct. 8-10, seem to be closely allied to *Leachellus*, but to indicate a different species. The median white stripe is well removed from costa and narrower, the lower tooth very distinct. Along the lower edge of the stripe is a black marginal shade at base; and beyond the tooth there are three or four short and thick oblique black dashes to the tip of the stripe and standing out from it. The hind wings are pale fuscous, darker than in *Leachellus*. The terminal markings of fore wings are similar. The general color is a deeper brown. It may be only a local modification of *Leachellus*, but it is easily distinguished.

CRAMBUS EXESUS, n. s.

Color of *Leachellus* but with the white stripe extending through to external margin, where it is bent upwards to near the tip of the wing and colors the fringes white. A terminal series of white, black-centered dots

visible below the median stripe. Costal edge narrowly whitish. Hind wings white with white fringes. Thorax brown. *Expanse* 25 mil. Hab. New York. I sent a specimen to Prof. Zeller, who knew the species, but had no name for it and placed it between *latistrius* and *halterellus*. The median stripe is evenly margined, without tooth, and the brown of the wing takes a deeper tone along its edges and appears as a deeper streak at apices.

CRAMBUS VULGIVAGELLUS Clem., Pr. Acad. N. S. Phil., 203, 1860.

Four specimens from Vancouver's Island (Hy. Edwards' coll., No. 4644) are a little smaller than Eastern examples, but should, I think, be referred here, as I see no other differences.

CRAMBUS GOODELLIANUS, n. s.

Pale ochre yellow, head and thorax whitish; fore wings dusted longitudinally with fuscous. An orange line crosses the wing at beyond the middle, twice feebly dentate, on the cell and again on vein 2. The usual transverse outer line is orange and bent as usual opposite the cell. Terminal space narrowly orange inferiorly. A terminal series of minute black points. Fringes metallic. Hind wings very pale, whitish with ochrey tinge; fringe white. *Expanse* 20 to 25 mil. Hab. Amherst, Mass., L. W. Goodell; Penn. Larger than *topiarius* and differing by the median ochre yellow line.

CRAMBUS TOPIARIUS Zeller.

A specimen is sent me from Mr. Hy. Edwards from Sierra Nevada, Cal. It is smaller than Eastern specimens; the hind wings quite dark; else it does not differ.

CRAMBUS OREGONICUS, n. s.

In color resembling *elegans*; larger, with more pointed primaries and oblique outer margin. Light brown. A longitudinal diffuse white stripe runs from base below median nervure and extends over the nervules. A deep brown acutely dentate mesial line, of which sometimes but a brown dash on submedian space and another at extremity of disc is visible. The outer mesial line is brown, lined with white. Fringes brownish with a fine white basal line. Hind wings pale fuscous with narrow terminal line and white fringes. *Expanse* 17 mil. Hab. Oregon, two specimens, Coll. Mr. Hy. Edwards, No. 5923.

CRAMBUS ANCEPS, n. s.

♂ ♀. Belongs to the group of fuscous species with the primaries crossed by two angulated dark lines. Narrow-winged; deep brownish fuscous; outer line followed by a faint narrow pale shading; inner line fused with a dark outer discal spot; lines irregular and rather broad, angulated on cell. Hind wings fuscous with fuscous fringes and traces of an extra mesial shade line. Head and thorax dark fuscous; legs paler; wings fuscous beneath. *Expanse* 18 mil. Sauzalito, Cal., Behrens, Oct. 6, two specimens.

CRAMBUS LACINIELLUS, n. s.

♂ ♀. This species, of which I have examined large material, principally collected by Mr. Fish in Maine, is allied to *fuscicostellus*. It is larger, without the median gray shade, but shades gradually from the ochrey fuscous costal region to the paler and grayish internal region of the primaries. There is a very narrow bright line between two black hair-lines at the base of the fringe. The wing is crossed by two broken rusty lines, the inner more oblique, both more or less faint and incomplete. The hind wings are very pale fuscous, paler than in *fuscicostellus*. Prof. Zeller has drawn my attention to the existence of allied species to *fuscicostellus*, but not until recently could I satisfy myself as to what the latter species was. According to the description "spatio inter costam et venam medianum distincte canescente" and Prof. Zeller's recent determination of a specimen sent him under the letter "d," I now recognize his species from Texas and N. Y. It is smaller and deeper colored than *laciniellus*, the gray median striped shade extends over the middle of the wing, diffusely continued in some specimens to external margin. The outer of the two lines is broken into dots and the lines are narrower and deeper colored. The fringes are darker, shining fuscous, and I cannot see the double hair-lines of *laciniellus*. The latter expands 26 to 29 mil. Mount Desert (Grote); Orono (Fish). I have sent this species to Zeller under the Nos. 2 and 30.

CRAMBUS ATTENUATUS, n. s.

Fore wings narrow, dusty ochrey fuscous with an ill-defined median gray or whitish stripe extending outwardly diffusely along the veins to external margin. This stripe is crossed at the middle of the wing by an oblique brown line, not always legible, the fragment of a mesial line. Exterior line very near the margin, only visible in a double, outwardly

oblique line before the apices. Hind wings fuscous with whitish fringes. *Expanse* 24 mil. *Hab.* Vancouver Island, Coll. Mr. Hy. Edwards, No. 5927. This species is narrower winged than *fuscicostellus* and paler, more ochrey colored.

CRAMBUS (PROPEXUS) EDONIS, n. s.

♂ ♀. Male antennæ lengthily pectinate. Labial palpi excessively long. Front flat, not acuminate and produced as in *vulgivagellus*. On these characters I found the new group, including in it *plexellus*, *pectinifer*, *edonis* and an unnamed Texan form, perhaps the same as the latter. The new species is allied to *plexellus*; male antennæ bipectinate; fore wings pale salmon red, without markings, dusted on the interspaces longitudinally, and especially terminally with fuscous. Palpi dark externally. Beneath dark fuscous; costa of primaries reddish over basal two-thirds. Legs fuscous. Hind wings fuscous with paler fringes. Fringes on primaries fuscous. Thorax fuscous; tegulæ and head reddish. *Expanse* 36 mil. *Hab.* Kansas, Prof. Snow. One fresh specimen, No. 288; one male, two females from Mr. Ashton. The females are plainer and more faintly colored, the antennæ are simple, the hind wings paler.

I have received from Texas a form which has paler hind wings in the male and has not the reddish tinge of *edonis*. Entirely pale dusty ochre. Male antennæ bipectinate. Wings apparently narrower than in *edonis*, but as long, longer than in *plexellus*. Fore wings ochrey with faint fuscous shades and traces of brighter longitudinal tintings. No markings. Hind wings whitish at base, becoming dusty ochrey outwardly. *Expanse* ♂ 33, ♀ 38 mil. *Hab.* Texas (Belfrage, No. 454; Belfrage's number for *plexellus* is 455). Three specimens examined. This form may fall in with *edonis* on the discovery of fresher specimens, but it is not unlikely distinct.

CORRESPONDENCE.

I have again to record the scarcity of butterflies during the past year, not only in the vicinity of St. John, but in other parts of this Province and in Nova Scotia. This scarcity is particularly noticeable in some of our more common species, which a few years ago were so numerous. I did not observe a single specimen of *P. cardui* or *P. huntera* last summer, although the larvæ were so abundant in 1878. *Pieris rapæ* and *Colias philodice* are fast disappearing from this locality. Botanists who have visited distant parts of N. B. during the past summer, in their collecting

tours, inform me that they have seen very few butterflies of any species. Intelligent—non-scientific—observers in Nova Scotia furnish me with like information. Moths have also been exceedingly scarce. Indeed, this scarcity is observable in all kinds of insects, with the exception of a few species of Dragon-flies, which have been unusually abundant near St. John.

CAROLINE E. HEUSTIS, St. John, N. B.

On July 18th three examples of *Spilosoma virginica* Fabr. emerged from their cocoons. The larvæ were fed on sorrel. One of the moths (a female) has a very curious process on each side of the thorax in front, near the costa of the fore wings at the base. They are globular in form; of a pale yellowish color, but with a vitreous lustre, and look like another pair of eyes that protrude from the head somewhat, except in color. Their diameter would measure, I should think, about one-half line. On touching the organs with an instrument I found them quite hard, and apparently of a permanent nature. I have raised several others this season of both sexes, but in none of them was there any trace of these processes, as far as I could see. I have never seen upon any insect, nor have I ever seen described any organs that correspond at all with these. If any one would like to examine this specimen, I will forward it to them for that purpose.

Aug. 1st I accidentally made a discovery that thereafter facilitated the capture of many species of moths, and thinking that it might be new to other collectors, I give it for their benefit. As I was returning home from my baited trees I beat a few bushes for moths as usual, when on beating a particular clump of scrub oaks a large number of moths flew out, many of them quite large Noctuids. I saw that there must be an unusual attraction there, but what it was I did not then find out. Many of the moths returned to the bushes again soon after being routed. At the time of discovery there must have been several hundreds in the clump, for I captured about a hundred in from fifteen to twenty minutes. I afterwards obtained a large number of moths there, and found that the greatest attraction seemed to be a sort of gummy juice (probably saccharine) that existed in the new buds that were nearly matured for another season's growth, although they were also found more or less plentifully on the youngest stems and leaves. Although other clumps of scrub oaks were afterwards examined, I found very few in other localities. I obtained from this clump of oaks many species that I had never taken before, and that I found no where else.

J. ELWYN BATES, So. Abington, Mass.

